

What is claimed is:

1. A system for positioning components of different thicknesses on a component platform, comprising:
  - a frame;
  - 5 a tool head connected to the frame, the tool head being vertically movable;
  - a retractable vacuum tube receivable within the tool head; and
  - a grasping assembly which can be actuated to securely hold the vacuum tube in a fixed position relative to the tool head after the vacuum tube has been at  
10 least partially received within the tool head.
2. The system of Claim 1, wherein the grasping assembly comprises a bushing which is movable along a collet.
3. The system of Claim 1, wherein the grasping assembly further comprises a knob for manually rotating the vacuum tube about an axis extending  
15 longitudinally therethrough.
4. The system of Claim 1, wherein the frame supports the tool head such that the tool head can be moved in X and Y directions.
5. The system of Claim 1, wherein the components comprise electronic components.
- 20 6. The system of Claim 5, wherein the electronic components comprise integrated circuit chips.

7. The system of Claim 1, wherein the component platform comprises a printed circuit board.

8. A method of positioning a component on a target surface, comprising:  
positioning a tool head over the component, the tool head having a

5 retractable vacuum tube extending downwardly therefrom;

lowering the tool head until the vacuum tube contacts an upper surface of the component and is pushed into a retracted position within the tool head;

securely holding the vacuum tube in a fixed position relative to the tool head after the vacuum tube has been pushed into the retracted position within the  
10 tool head;

lifting the tool head, thereby lifting the component with the vacuum tube;

positioning the tool head over the target surface;

lowering the tool head such that a bottom surface of the component is positioned in contact with the target surface; and

15 releasing the component from the vacuum tube.

9. The method of Claim 8, wherein the vacuum tube is securely held in a fixed position relative to the tool head after the vacuum tube has been pushed into the retracted position within the tool head by:

moving a bushing along a collet within the tool head.

20 10. The method of Claim 8, wherein the component comprises an electronic component.

11. The method of Claim 10, wherein the electronic component comprises an integrated circuit chip.

12. The method of Claim 8, wherein the target surface comprises a printed circuit board.

13. The method of Claim 12, further comprising:  
placing the printed circuit board on a movable component platform; and  
positioning the printed circuit board by moving the component platform.

5

14. The method of Claim 13, wherein the component platform and the tool head are both attached to a frame of a positioning system, and wherein each of the component platform and the tool head are separately positionable in X and Y directions.